(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
23 June 2005 (23.06.2005)

PCT

(10) International Publication Number
WO 2005/057165 A3

(51) International Patent Classification[7]: G06F 19/00

(21) International Application Number:
PCT/US2004/040298

(22) International Filing Date: 3 December 2004 (03.12.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/527,455 5 December 2003 (05.12.2003) US

(71) Applicant *(for all designated States except US)*: **THE REGENTS OF THE UNIVERSITY OF MICHIGAN** [US/US]; Technology Management Office, Wolverine Tower, Room 2071, 3003 S. State Street, Ann Arbor, MI 48109-1280 (US).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **LIN, Chia-Ying** [Stateless/US]; Apt. 10, 2131 Glencoe Hills Dr., Ann Arbor, MI 48108 (US). **HOLLISTER, Scott, J.** [US/US]; 2105 Churchill Drive, Ann Arbor, MI 48103 (US).

(74) Agents: **SNYDER, Jeffrey, L.** et al.; Harness, Dickey & Pierce, P.L.C., P.O. Box 828, Bloomfield Hills, MI 48303 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

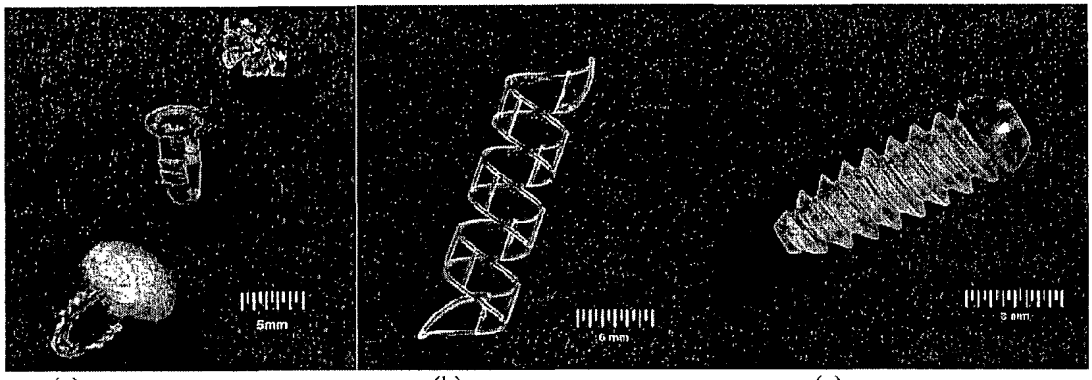
(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

(88) Date of publication of the international search report:
9 September 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: BIODEGRADABLE/BIORESORBABLE TISSUE AUGMENTATION/RECONSTRUCTION DEVICE



(a) (b) (c)

(57) Abstract: A method of manufacturing biodegradable/bioresorbable tissue augmentation/reconstruction devices by defining material density distributions at selected time points during a material degradation lifecycle. These different density distributions are then superposed using general linear and/or nonlinear functions that could include both time and degraded base stiffness weighting factors. The material density distribution may be created using topology optimization, image-based design or computed aided design methods to create a degradable device that retains sufficient physical properties (ie modulus, strength, electrical conductivity, thermal conductivity) through the material degradation lifecycle process. Thus, any bulk degrading material can be designed using this process for any tissue augmentation/reconstruction application.

WO 2005/057165 A3